



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/808,613 | 03/25/2004 | Shinroku Macjima | 50099-253 | 5019 |

7590 04/10/2007
MCDERMOTT, WILL & EMERY
600 13th Street, N.W.
Washington, DC 20005-3096

| |
|----------|
| EXAMINER |
|----------|

NGUYEN, DANG T

| | |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

2824

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 04/10/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| | | | |
|------------------------------|-----------------|----------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/808,613 | MAEJIMA ET AL. | |
| | Examiner | Art Unit | |
| | Dang T. Nguyen | 2824 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 January 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4 and 12-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4 and 12-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>Search history</u> . |

DETAILED ACTION

1. This action is responsive to applicant's Request for Continued Examination (RCE) filed on 3/6/2007 and the applicant's amendment received on 1/22/07.
2. Claims 1 – 3 and 5 have been canceled. Claims 6 – 11 stand withdrawn. Claim 4 has been amended. Claims 4 and 12 - 14 are pending on this application. Claim 4 is independent claim.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 is rejected for the use of improper languages. What does it mean of opposite sides of a hard axis? axis is just used for direction not for sides. Examiner suggests: "a configuration of said magnetic recording element includes a straight line (the straight line situated in recording element 101) parallel to a hard axis".

Claim 4 recites the limitation "at said one of said opposite sides". Examiner suggests: "the side face of said magnetic recording element and a side face of said first conductor are aligned with each other at the direction of the hard axis" as indicated under **Remarks**, page 6. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 4 and 12 - 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Perner et al., U.S. Patent No. US 6,947,313 B2 – filed Aug. 27, 2003.

Regarding independent claim 4, Fig. 6 of Perner discloses a magnetic recording device having a magnetic recording element (222) and a first conductor (226) connected to said recording element (*element 222 connects to 226*), wherein a configuration of said magnetic recording element (222) includes a straight line (the straight line that parallel with Y direction) situated in one of opposite sides of a hard axis (X), said first conductor (226) extends along said hard axis (X), and a side face of said magnetic recording element (the side face of 222) and a side face of said first conductor (the face of conductor 226) are aligned with each other at said one of said opposite sides (*see Fig. 6 the side face of element 222 and conductor 226 are aligned to each other at the one of the opposite sides, the bottom of element 222 are aligned with the top of conductor 226*).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 12 - 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perner et al., U.S. Patent No. 6,947,313 B2 in view of Ounadjela et al., U.S. Patent No. 6,798,691 B1 - filed Jun. 28, 2002.

Regarding dependent claim 12, Perner as applied to claim 4 above disclosed every aspect of applicant's claimed invention except for a magnetic layer showing an S-shaped magnetization distribution when a strength of a magnetic field applied to said magnetic layer along said hard axis of said magnetic layer is higher than a threshold value and showing a C-shaped magnetization distribution when said strength of said magnetic field applied to said magnetic layer along said hard axis is lower than said threshold value.

Fig. 4 of Ounadjela discloses a magnetic layer showing an S-shaped [42b] magnetization distribution when a strength of a magnetic field applied to said magnetic layer (Col. 19 lines 60-64) along a hard axis of said magnetic layer is higher than a threshold value (Col. 18 line 40 – Col.19 line 17) (*Fig. 42b discloses when a strength of magnetic field applied more current IDI along a hard axis to the selected level then it transverse magnetic field in the S-shaped, inherent the magnetic layer is higher than threshold voltage then the switching state occurs*) and showing a C-shaped [40b]

Art Unit: 2824

magnetization distribution when said strength of said magnetic field applied to said magnetic layer (Col. 19 line 45 – Col. 20 line 5) along said hard axis is lower than said threshold value (Col. 18 line 25 – Col. 20 line 5, *for disclosing if a strength of magnetic field current applied lower current or no external magnetic fields are applied along a hard axis then a magnetization in the C-state*).

Perner and Ounadjela are common subject matter for magnetic memory.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the S-shaped of Ounadjela into the magnetic element of Perner for the purpose of providing an magnetic memory cell having a configuration that is substantially insensitive to variation in shape, size, and the presence of defects and also providing a method, which not only reduces the current margin between individual memory cells, but also reduces the overall amount of current required during a writing procedure (Col. 3 lines 26-35).

Regarding dependent claim 13, Perner as applied to claim 12 above disclosed every aspect of applicant's claimed invention except for said configuration of said magnetic layer is symmetrical with respect to an axis parallel to said hard axis and asymmetrical with respect to an easy axis of said magnetic layer.

Fig. 4 of Ounadjela discloses wherein a configuration of said magnetic layer is symmetrical with respect to an axis parallel to said hard axis (Col. 24 lines 1-3) and asymmetrical with respect to an easy axis of said magnetic layer (Col. 13 lines 1-20).

Perner and Ounadjela are common subject matter for magnetic memory.

Therefore it would have been obvious to one having ordinary skill in the art at the time

the invention was made to incorporate the configuration of the magnetic layer of Ounadjela into the magnetic element of Perner. Since Ounadjela taught the benefit by pointing out that the use of symmetrically shaped memory cells is likely to produce at least some variation in the switching fields associated with the individual cells in a memory array and the asymmetrical memory cell would avoid large discontinuities of local magnetic vectors at the edges of the memory cell by including smoothly curved edges (Col. 11 lines 55-57 and Col. 12 lines 4-7).

Regarding dependent claim 14, Perner as applied to claim 12 above disclosed every aspect of applicant's claimed invention except for the configuration of said magnetic layer includes a rounded corner.

Figs. 3, 4 and 12 of Ounadjela disclose the configuration of said magnetic layer includes a rounded corner (Col. 23 lines 17-31).

Perner and Ounadjela are common subject matter for magnetic memory. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate Ounadjela's rounded corner into Perner's magnetic element for the purpose of providing an magnetic memory cell having a configuration that is substantially insensitive to variations in shape, size, and the presence of defects.

Response to Arguments

6. Applicant's arguments filed on 7/20/06 with respect to claim 4 have been considered but are moot in view of the new ground(s) of rejection.

Contact Information


7. Any inquiry concerning this communication from the examiner should be directed to Dang Nguyen, who can be reached by telephone at (571) 272-1955. Normal contact times are M-F, 8:00 AM - 4:30 PM.

Upon an unsuccessful attempt to contact the examiner, the examiner's supervisor, Richard Elms, may be reached at (571) 272-1869.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist, whose telephone number is (703) 305-3900. The faxed phone number for organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the Status of an application may be obtained from the patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or EBC@uspto.gov.

Dang Nguyen 3/30/2007


VANTHU NGUYEN
PRIMARY EXAMINER

EAST Search History

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|-------|------|--|---|------------------|---------|------------------|
| S1 | 22 | (magnetic adj2 layer) same S-shape\$1 | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/09/17 14:33 |
| S2 | 1 | (magnetic adj2 layer) same S-shape\$1 same (magnetic adj2 field) same (hard adj2 axis) same (magnetic adj2 layer) same higher same threshold | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2005/11/02 12:21 |
| S3 | 1 | (magnetic adj2 layer) same S-shape\$1 same (magnetic adj2 field) same (hard adj2 axis) same (magnetic adj2 layer) same threshold | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2005/11/02 12:21 |
| S4 | 1 | (magnetic adj2 layer) same S-shape\$1 same (magnetic adj2 field) same (hard adj2 axis) same (magnetic adj2 layer) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2005/11/02 12:21 |
| S5 | 1 | (magnetic adj2 layer) and S-shape\$1 same (magnetic adj2 field) same (hard adj2 axis) same (magnetic adj2 layer) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2005/11/02 12:22 |
| S6 | 1 | (magnetic adj2 layer) and S-shape\$1 same (magnetic adj2 field) same (hard adj2 axis) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2005/11/02 12:22 |
| S7 | 4 | (magnetic adj2 layer) and S-shape\$1 and (magnetic adj2 field) and (hard adj2 axis) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2005/11/02 14:50 |
| S8 | 1 | S-shape\$1 with (magnetic adj2 layer) with higher | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2005/11/02 14:51 |

EAST Search History

| | | | | | | |
|-----|-----|--|---|----|----|------------------|
| S9 | 2 | S-shape\$1 same (magnetic adj2 layer) same higher | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2005/11/02 14:55 |
| S10 | 250 | S-shape\$1 with higher | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 09:49 |
| S11 | 1 | S10 and c-shape\$1 with lower | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2005/11/02 14:56 |
| S12 | 5 | S10 and c-shape\$1 | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2005/11/02 14:56 |
| S13 | 1 | (magnetic adj2 layer) same S-shape\$1 same C-shape\$1 same (threshold near2 value) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/05 10:08 |
| S14 | 1 | (magnetic adj2 layer) same S-shape\$1 same C-shape\$1 and (threshold near2 value) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/05 10:08 |
| S15 | 1 | (magnetic adj2 layer) and S-shape\$1 and C-shape\$1 and (threshold near2 value) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/05 10:08 |
| S16 | 3 | S-shape\$1 with higher with (threshold near2 value) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/05 10:11 |

EAST Search History

| | | | | | | |
|-----|----|--|---|----|----|------------------|
| S17 | 2 | "6,798691".pn. | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/05 10:13 |
| S18 | 1 | (magnetic adj2 layer) same S-shape\$1 same (hard near2 axis) same higher same threshold | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/05 10:15 |
| S19 | 1 | (magnetic near2 layer) same S-shape\$1 same (hard near2 axis) same higher same threshold | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/05 10:15 |
| S20 | 1 | (magnetic near2 layer) same S-shape\$1 same higher same threshold | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/05 10:16 |
| S21 | 23 | S-shape\$1 same higher same threshold | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/05 10:16 |
| S22 | 2 | magnetic same S-shape\$1 same higher same threshold | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/05 10:16 |
| S23 | 1 | magnetic and S-shape\$1 with higher with threshold | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/11 14:23 |
| S24 | 5 | magnetic and S-shape\$1 same higher same threshold | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/11 14:24 |
| S25 | 5 | ("3271204" "4587486" "4618823" "4678994").PN. | US-PGPUB; USPAT; USOCR | OR | ON | 2006/01/11 14:24 |

EAST Search History

| | | | | | | |
|-----|-------|---|---|----|----|------------------|
| S26 | 93620 | magnetic near2 layer | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/11 14:24 |
| S27 | 121 | S26 and S-shape\$1 | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/11 14:25 |
| S28 | 9 | S27 and c-shape\$1 | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 09:49 |
| S29 | 1 | S28 and threshold | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/11 14:25 |
| S30 | 7 | ("4514827" "4625297" "5459701" "5757695" "6005800" "6104633" "6178112").PN. | US-PGPUB; USPAT; USOCR | OR | ON | 2006/01/11 14:48 |
| S31 | 7 | ("5214840" "5756366" "6147922" "6175525" "6178111" "6455177" "6493258").PN. | US-PGPUB; USPAT; USOCR | OR | ON | 2006/01/11 14:52 |
| S32 | 2013 | S-shape\$1 and c-shape\$1 | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 09:35 |
| S33 | 114 | S32 and threshold | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 09:50 |
| S34 | 1 | S33 and (hard adj2 axis) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/11 14:57 |

EAST Search History

| | | | | | | |
|-----|-------|---|---|----|----|------------------|
| S35 | 5 | 365/171,173,158,55,66.ccls. and S-shape\$1 and c-shape\$1 | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 09:51 |
| S36 | 7 | ("4514827" "4625297" "5459701" "5757695" "6005800" "6104633" "6178112").PN. | US-PGPUB; USPAT; USOCR | OR | ON | 2006/01/12 09:46 |
| S37 | 1 | 365/171,173,158,55,66.ccls. and S-shape\$1 with higher | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 09:49 |
| S38 | 93659 | magnetic near2 layer | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 09:50 |
| S39 | 121 | S38 and S-shape\$1 | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 09:50 |
| S40 | 5 | S39 and c-shape\$1 and 365/171, 173,158,55,66.ccls. | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 09:50 |
| S41 | 2015 | S-shape\$1 and c-shape\$1 | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 09:50 |
| S42 | 1 | S41 and threshold and 365/171,173, 158,55,66.ccls. | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 09:51 |
| S43 | 1 | S41 and threshold and "365"/\$.ccls. | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 09:51 |

EAST Search History

| | | | | | | |
|-----|-----|--|---|----|----|------------------|
| S44 | 9 | "365"/\$.cccls. and S-shape\$1 and c-shape\$1 | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 10:05 |
| S45 | 7 | ("5214840" "5756366" "6147922" "6175525" "6178111" "6455177" "6493258").PN. | US-PGPUB; USPAT; USOCR | OR | ON | 2006/01/12 09:53 |
| S48 | 3 | "6,605836".pn. | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 09:55 |
| S49 | 5 | ("5652445" "5757695" "5953248" "5978182" "6104633").PN. | US-PGPUB; USPAT; USOCR | OR | ON | 2006/01/12 09:55 |
| S50 | 212 | (Shinroku with Maejima) (Shuichi with Ueno) (Takashi with Yakenaga) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 10:09 |
| S51 | 1 | S50 and (C-shape\$1 or C-state) and (S-shape\$1 or S-state) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 10:08 |
| S52 | 1 | S50 and (C-shape\$1 or C-state) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 10:08 |
| S53 | 2 | S50 and (magnetic near2 layer) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/01/12 10:08 |
| S54 | 1 | (record\$3 near2 element) and (first near2 conductor) and ((line or strap) with opposite with (hard near2 axis)) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/08/28 14:41 |

EAST Search History

| | | | | | | |
|-----|-------|--|---|----|----|------------------|
| S55 | 4 | (record\$3 near2 element) and (first near2 conductor) and ((line or strap) same opposite same (hard near2 axis)) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/08/28 15:15 |
| S56 | 7 | ("5986858" "6252749" "6325900" "6327107" "6496338" "6570744" "6667860").PN. | US-PGPUB; USPAT; USOCR | OR | ON | 2006/08/28 14:48 |
| S57 | 9 | (record\$3 near2 element) and (first near2 conductor) and ((line or strap) same (hard near2 axis)) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/08/28 15:18 |
| S58 | 65 | (side with magnetic with recording) same (side with conductor) same (align\$3 or linear or parallel) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/08/28 15:30 |
| S59 | 50600 | (magnetic with recording with device) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/08/28 15:30 |
| S60 | 4612 | S59 and (magnetic with recording with element) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/08/28 15:31 |
| S61 | 76 | S60 and (first near2 conductor) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/08/28 15:31 |
| S62 | 1 | S61 and (line with opposite with (hard near2 axis)) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/08/28 15:32 |
| S63 | 65 | S61 and (align\$3 or parallel or linear) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/08/28 15:33 |

EAST Search History

| | | | | | | |
|-----|-----|--|---|----|----|------------------|
| S64 | 62 | S63 and (line or strap) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/08/28 15:33 |
| S65 | 2 | "6,693825".pn. | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/09/15 17:01 |
| S66 | 2 | "6,798691".pn. | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/09/17 15:42 |
| S67 | 391 | (magnetic near2 element) and conductor and (hard near2 axis) and (easy near2 axis) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/09/17 15:45 |
| S68 | 171 | 365/171,158,173,55,66.ccls. and (magnetic near2 element) and conductor and (hard near2 axis) and (easy near2 axis) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/09/17 15:51 |
| S69 | 94 | 365/171,158,173,55,66.ccls. and (magnetic near2 element) and conductor and (hard near2 axis) and (easy near2 axis) and shape | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2007/03/30 16:06 |
| S70 | 9 | 365/171,158,173,55,66.ccls. and magneto-resistive and (magnetic near2 element) and conductor and (hard near2 axis) and (easy near2 axis) and shape | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/09/17 15:53 |
| S71 | 18 | 365/171,158,173,55,66.ccls. and magneto-resistive and (magnetic near2 element) and conductor and (hard near2 axis) and (easy near2 axis) and layer | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/09/17 15:53 |

EAST Search History

| | | | | | | |
|-----|-------|--|---|----|----|------------------|
| S72 | 19 | 365/171,158,173,55,66.ccls. and magneto-resistive and (magnetic near2 element) and conductor and (hard near2 axis) and (easy near2 axis) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/09/17 15:54 |
| S73 | 15 | 365/171,158,173,55,66.ccls. and MRAM and magneto-resistive and (magnetic near2 layer) and conductor and (hard near2 axis) and (easy near2 axis) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2006/09/17 15:55 |
| S74 | 5 | ("6351409" "6404674" "6504221" "6538917" "6593608").PN. | US-PGPUB; USPAT; USOCR | OR | ON | 2006/09/17 15:56 |
| S75 | 6 | ("5841692" "6097579" "6127045" "6259586" "6351409" "6396735").PN. | US-PGPUB; USPAT; USOCR | OR | ON | 2006/09/17 15:57 |
| S76 | 127 | 365/171,158,173,55,66.ccls. and ((magnetic near2 element) or TMR) and conductor and (hard near2 axis) and (easy near2 axis) and shape | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2007/03/30 16:21 |
| S77 | 9 | 365/171,158,173,55,66.ccls. and ((magnetic near2 element) or TMR) with conductor with ((hard near2 axis) or (X near2 axis)) with ((easy near2 axis) or (Y near2 axis)) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2007/03/30 16:08 |
| S78 | 51 | 365/171,158,173,55,66.ccls. and ((magnetic near2 element) or TMR) same conductor same (hard near2 axis) same (easy near2 axis) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2007/03/30 16:34 |
| S79 | 17255 | Hung.in. | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2007/03/30 16:13 |
| S80 | 323 | "365"/\$.ccls. and Hung.in. | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2007/03/30 16:14 |

EAST Search History

| | | | | | | |
|-----|----|---|---|----|----|------------------|
| S81 | 43 | "365"/\$.ccls. and Hung.in. and conductor | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2007/03/30 16:14 |
| S82 | 2 | 365/171,158,173,55,66.ccls. and (((magnetic near2 element) or TMR) with (NiFe with CoFe)) and conductor and (hard near2 axis) and (easy near2 axis) and shape | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2007/03/30 16:23 |
| S83 | 8 | (((magnetic near2 element) or TMR) with (NiFe with CoFe)) and conductor and (hard near2 axis) and (easy near2 axis) and shape | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2007/03/30 16:29 |
| S84 | 1 | 10/808613 | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2007/03/30 16:27 |
| S85 | 8 | (((magnetic near2 element) or TMR) with (NiFe with CoFe)) and conductor and (hard near2 axis) and (easy near2 axis) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2007/03/30 16:29 |
| S86 | 0 | 365/171,158,173,55,66.ccls. and (((magnetic near2 element) or TMR) with ((record\$3 near2 layer) or (NiFe near2 CoFe))) same conductor same (hard near2 axis) same (easy near2 axis) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2007/03/30 16:35 |
| S87 | 0 | (((magnetic near2 element) or TMR) with ((record\$3 near2 layer) or (NiFe near2 CoFe))) same conductor same (hard near2 axis) same (easy near2 axis) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2007/03/30 16:35 |
| S88 | 21 | (((magnetic near2 element) or TMR) with ((record\$3 near2 layer) or (NiFe near2 CoFe))) and conductor and ((hard near2 axis) or (x near2 axis)) and ((easy near2 axis) or (y near2 axis)) | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB | OR | ON | 2007/03/30 16:37 |